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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/475,487	12/30/1999	AZAR ASSADI	042390.P6880	6378

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EXAMINER

MYERS, PAUL W

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 08/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/475,487

Applicant(s)

ASSADI, AZAR

Examiner

Paul W Myers

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,976,907 to Shigeta et al in further view of U.S. Patent No. 5,682,265 to Farn et al.

- a. In regard to claim 1, 9 and 13 Murakami on page 4 paragraphs [0043], [0044] and figure 2 detail and integrated pixel sensor consisting of a light sensitive diode (4 and 5) including a transparent conductor (1). Murakami further teaches that a protective layer (8 and 9) is placed above the transparent conductor (1).

Murakami does not disclose protective layer including a set of diffraction grating elements for producing complementary colors.

However, Shigeta in column 6 line 55 to column 7 line 4 details a protective layer (30 and 15) that has color filters (14) disposed within the protective layer (30 and 15) capable of producing complementary colors.

It would have been obvious to anyone of ordinary skill in the art at the time of the invention to combine Murakami's image sensing device with Shigeta's color filters to produce an image sensor capable of sensing complementary colors.

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Shigeta does not disclose a set of diffraction grating elements.

However, Farn in column 2 lines (60-67) and figure 1 detail a diffraction grating that is capable of producing complementary colors. Farn in column 1 lines 29-35 teaches that color filters only allows light associated with one of the three complementary colors to pass. Farn further details that this is inefficient because $2/3$ of the source light is lost.

It would have been obvious to anyone of ordinary skill in the art at the time of the invention to combined Murkami's image sensing device and Shigeta's color sensing device with Farn's diffraction grating to form an energy efficient color image sensor.

b. In regard to claims 2, 6, 10 and 14, Murakami in figure two details a protective layer (8 and 9) that includes anti-reflection properties (8).

c. In regard to claim 3, 7, 11 and 15, Murakami's on page 2 paragraph [0012] details that his invention relates to a device and method of manufacturing a Solid-State Imaging Device. Any of the materials used to manufacture Murakami's device including the materials used for the protective layer would be suitable for the fabrication process.

d. In regard to claim 4, 8, 12 and 16, Farn in figure 1 shows a four step echelon grating element.

e. In regard to claim 5, Murakami fails to teach a post capture signal processing unit coupled to the integrated pixel sensor. Official Notice is taken that both the concept and

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the advantages of providing signal processing in a camera are well known and expected in the art. It would have been obvious to have couple a signal processing unit to the integrated pixel sensor to process and manipulate the incoming signals from the integrated pixel sensor in order to help facilitate the use of the incoming information. For further information regarding the limitations set forth in claim 5, refer to examiners notes for claim 1.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

f. U.S. Patent No. 5,600,486 to Gal et al teaches grating elements on microlenses to separate color.

g. J.P 10190043 A to Hanato teaches a diode with micro lenses and grating.

h. U.S. Patent No. 4,970,381 to Huang et al details diode with micro lenses and grating.

i. U.S Patent No. 5,760,885 to Yokoyama et al for an image sensor with anti-reflective material, grating, and micro lenses.

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- j. U.S. Paten No. 5,746,797 to Noda for grating in an optical element.
- k. U.S. Patent No. 6,194,704 to Assadi et al teaches lenses for photo detectors and grating.
- l. U.S. Patent No. 6,150,653 to Assadi et al teaches lenses for photo detectors and grating.
- m. U.S. Patent No. 5,517,279 to Hugle et al teaches micro lenses and grating.
- n. U.S. Patent No. 5,871,888 to Heremans et al for multilayer micro lenses.
- o. U.S. Patent No. 6,610,390 to Miyano for micro lenses used in an image device.
- p. U.S. Patent No. 5,371,397 to Maegawa et al for a solid-state image device using micro lenses.
- q. U.S. Patent No. 6,614,950 to Park et al for ccd imager.
- r. U.S. Patent No. 5,682,203 to Kato for a plurality of photocells and micro lenses.
- s. U.S. Patent No. 5,514,888 to Sano et al for an on-chip image sensor.

- t. U.S. Patent No. 5,323,052 to Koyama for a wide-angle response image pickup device.
- u. U.S. Patent No. 4,667,092 to Ishihara for Image device with resin lenses
- v. U.S. Patent No. 5,321,297 to Enomoto for and image device with light conversion lenses.
- w. U.S. Patent No. 5,677,200 to Park et al for color charge-coupled device with micro lenses
- x. U.S. Patent No. 5,258,024 to Cavel et al for materials used in manufacture of lenses.
- y. U.S. Patent No. 5,672,519 to Song et al for micro lenses with a photodiode and color filters.
- z. U.S. Patent No. 5,768,023 to Sawaki et al for micro lenses with color and grating.
- aa. U.S. Patent No 5,648,874 to Sawaki et al for plurality of micro lenses and grating.


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4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul W Myers whose telephone number is (703) 305 4039. The examiner can normally be reached on Mon-Fri 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on (703) 305 4929. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872 9314 for regular communications and (703) 872 9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306 0377.

PWM PWM
August 25, 2003


WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600